

A parasite is an organism that grows, feeds, and is sheltered on or in a different organism while potentially harming the host. The organism that the parasite lives with is called a host. The Acanthocephala phylum of spiny-headed worms require two hosts: they live in crustaceans and insects as juveniles, and in the digestive tracts of vertebrates as adults. In the Gulf of the Farallones National Marine Sanctuary, *Profilicollis* species have caused die-offs of Surf Scoters (diving ducks) and could affect the few sea otters living here.



Surf Scoter (*Melanitta perspicillata*)

Life Cycle of Acanthocephala

Some coastal birds are a definitive host for Acanthocephala, meaning that the parasite can reproduce. Birds carry adult parasites in their small intestine where female worms produce eggs, which are passed in the bird's feces. The eggs are eaten by intermediate hosts and the parasite changes into an infective stage called a cystacanth. The definitive host is infected when it ingests an infected intermediate host. The cystacanth excysts in the small intestine and matures into an adult worm. *Profilicollis* species use Pacific mole crabs (*Emerita analoga*) and spiny mole crabs (*Blepharipoda occidentalis*) as intermediate hosts, and Surf Scoters (*Melanitta perspicillata*) as definitive hosts. The parasites affect sea otters (*Enhydra lutris*) as well, but they are a dead-end host because the parasites are not able to reproduce.



Acanthocephalan parasite inside a Pacific mole crab

Effects on Organisms

Pacific mole crabs are the primary intermediate host for Acanthocephalans. In *Emerita analoga* the parasites are located in the posterior hemocoel near the midgut. They look like white footballs, and can be seen by the naked eye. The parasites are not lethal to mole crabs, although they could affect their behavior, perhaps making them easier prey. In both the definitive and dead-end hosts, Acanthocephalans induce peritonitis, which is inflammation around the abdominal cavity. Peritonitis occurs when larval Acanthocephalan parasites that reside in the intestine migrate through the intestinal wall, allowing bacteria to infect the abdominal cavity.

In 1995, the California Department of Fish and Game estimated that 1000-4000 Surf Scoters died due to an unusually high load of Acanthocephalan parasites. Mortality is hindering the growth of the threatened California sea otter population. Forty to fifty percent of sea otter deaths are caused by infectious disease, of which the most prevalent is Acanthocephalan peritonitis. High school students are investigating parasite load as part of sand crab monitoring in the Gulf of the Farallones National Marine Sanctuary.



Sea otter (*Enhydra lutris*)

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